ROMANES' IDEA OF MENTAL DEVELOPMENT.[1]

By MARION HAMILTON CARTER, B. S.

In a previous paper the present writer discussed Darwin's Idea of Mental Development.[2] This second article follows closely the lines there laid down.

§ 1. GENERAL PSYCHOLOGY.

Before beginning an inquiry into the views of Romanes upon Mental Development and its place in evolutional theory, it will not be without profit to take a brief survey of the system of psychology which he held, and which was an integral portion of his philosophical creed.

Unlike Darwin, Romanes has been looked upon, more or less, as a psychologist, and has left us several volumes upon psychological and philosophical questions. His speculations were not confined to natural philosophy, but embraced the ultimate realities and the nature of things in their last analysis. Romanes had begun to be interested in metaphysical subjects in his early manhood, and throughout his life and almost to the day of his death devoted much of his most earnest and critical thought to the problems of Man, of Right, of Duty, and of the Ultimate First Cause. It is beyond the pale of this study to give an account of the changes which took place in his philosophical and religious views. It is sufficient here to say that his was a mind ever reaching out toward explanations more ultimate than those that could be given by a study of natural phenomena alone, and that to him the investigation of nature by purely inductive methods could never be adequate or satisfying. Throughout his work, therefore, we find constant attempts to systematize, to bring all the data of science into harmony with a general plan or cosmological scheme.

Romanes has left us three volumes dealing with human and animal psychology. In so extensive a contribution one may reasonably expect from an author a definite and systematic statement of the fundamental data of his subject. For this, however, the reader will search these books in vain. In the work entitled *Mental Evolution in Animals* Romanes has given

[1] From the Psychological Seminary of Cornell University.

[2] *Amer. Jour. of Psychology*, Vol. IX, No. 4.

us chapters on the Criterion of Mind, the Physical Basis of Mind, Consciousness, Sensations, Pleasures and Pains, Memory and Association of Ideas, Percepts, Imagination and Instinct. In the *Mental Evolution in Man* he has continued the former book by chapters on Ideas, Logic of Recepts, Logic of Concepts, Self-consciousness, and Language.

It is possible that a clear and concise statement of the bare facts of human psychology appeared to him unnecessary in his treatment of the subject. It was his purpose to trace the development of the various mental processes from those occurring in the lowest organisms to those in the highest; and owing to this purpose he probably thought it not incumbent upon him to attempt any special work in systematic psychology as such. In addition to this, he had had little or no training in psychology, and his knowledge of it was derived from reading. I believe it is due to both these facts that his work in psychology has so little coherence. He relied upon the work of others to a surprising degree, and his treatment of human psychology is almost entirely made up of quotations, and contains little or nothing original excepting his discussion upon 'Recepts.' Romanes was the inventor of the term 'recept.' "In addition, then, to the terms Percept and Concept, I coin the word *Recept*. This is a term which seems exactly to meet the requirements of the case. For as perception literally means a *taking wholly*, and conception a *taking together*, reception means a *taking again*. Consequently, a recept is that which is taken again, or a re-cognition of things previously cognized. Now, it belongs to the essence of what I have defined as compound ideas (recepts), that they arise in the mind out of a repetition of more or less similar percepts."[1] 'Recepts' are general ideas which have not been given a name, and have not been consciously classified. The associations we have with them are of the passive kind, as the associations we have with the cognate words are of the active kind. In receiving such ideas the mind is passive, as in conceiving abstract ideas the mind is active. "Recepts, then, are *spontaneous associations, formed unintentionally* as what may be termed *unperceived abstractions*."[2]

In the *Mental Evolution in Man* Romanes devotes a lengthy chapter to the logic of recepts—a chapter much padded with quotations from Sully, Perez, J. S. Mill, Mansel, Huxley, Lazarus, Steinthal, F. Müller, Comte, Binet, G. H. Lewes, Darwin, Preyer, Leroy, Locke, Taine, besides some of his own previous works. What he wishes to set forth here is that along with "the logic of signs, there is a logic of images, and a logic

[1] *Mental Evolution in Man*, p. 36.
[2] *Ibid.*, p. 37.

of feelings."[1] The word 'recept' is taken to cover all those cases of the ideas on the borderland between percepts and concepts,—a disputed and often unrecognized region which Romanes set himself to investigate. "The question, then, which we have to consider is whether there is a difference of kind, or only a difference of degree, between a recept and a concept. This is really the question with which the whole of the present volume will be concerned."[2]

Romanes distinguished five kinds of ideas: the percept (a simple memory image), lower recepts, higher recepts, lower concepts, higher concepts, forming a perfect developing series, the one being closely united with the other by derivation, *i. e.*, by growth from the lower to the higher. In order to elaborate this theory more fully he had recourse to philology, and traced back the conceptual meanings of words to their 'receptual' origin. The following paragraph sums up his results clearly:

"Now I hold that this receptual nucleus of all our conceptual terms furnishes the strongest possible evidence, not only of the historical priority of the former, but also of what Professor Max Müller calls their 'dire necessity' to the growth of the latter. In other words, the facts appear conclusively to show that conceptual connotation (denomination) has always had—and can only have had—a receptual core (denotation) around which to develop. Psychological analysis has already shown us the psychological priority of the recept; and now philological research most strikingly corroborates this analysis by actually finding the recept in the body of every concept."

Thus Mental Evolution for him consisted not in Feeling, not in Sensitivity to Pleasure or Pain, not in Co-ordinated Movements, not in Will, but in the various types of Ideation from percept to 'higher concept,' in a progressive series,—from the mere recognition of sense impressions *as such*, to a classification of them, and a classification *known as such*. Between the percept and the concept the unnamed general idea formed for him the natural link, and in the field of unnamed general ideas Romanes thought he had discovered a *terra incognita* to be explored and exploited for the benefit of evolutional psychology. The data which he collected regarding human and animal psychology were examined and evaluated largely with reference to the light they threw upon his theory of recepts; and he made excursions into every region which seemed to promise facts bearing in any way upon it.

It will thus be seen that the term 'recept,' in giving him a clearly named, unbroken line of ideation from lower to higher, against which he could measure the ideation of any given individual or species of animals, was the keystone to the arch sup-

[1] *Ibid.*, p. 42.
[2] *Ibid.*, p. 45.

porting the larger part of his theory of mental development. The 'recept' was, in fact, the *sine qua non* of his evolutional psychology; he invented the term, defined its limits, and published a volume (*Mental Evolution in Man*), the bulk of which was devoted to the proof of the existence of recepts and the exposition of his theories concerning them. It was, therefore, a matter of considerable regret to him that the word was not recognized by psychologists and obtained no hold in scientific nomenclature.

The reason for this is obvious from the quotations given. A 'recept' signifies no new conscious element or connection of elements, no process which differs in kind from those already well known to psychology. The term stands for a logical, not a psychological fact, and it has, therefore, no place in the psychological analysis of mental processes. The moment this is appreciated the keystone drops from the arch, carrying with it most of the superstructure, and leaving in ruins the greater part of Romanes' work upon mental development. In his evolutional scheme he obtained intelligence from the upward push of reflex action through instinct, and his theory of the subsequent development of mind itself he builds from materials which for psychology, at least, do not exist. However mind may evolve, it certainly does not evolve by means of the number or complexity of the terms which can be logically analyzed as coming under the head of a single psychological process. Mental development, if it be a reality, is something other than a procession of logical categories.

Romanes' most popular work was his 'Animal Intelligence.' The collection of the material for this occupied him many years, was derived from a great variety of sources, and was critically sifted, all instances not well attested being excluded. To the facts given, however, he added his own interpretations,—interpretations frequently so anthropomorphic and crude as to have scarcely a shadow of a claim to the consideration of the student of psychology. Some of these are not of his actual authorship, but since he quotes them without comment we are justified in laying the responsibility for them upon him.

From the Rev. W. Farren White he gives the following: "I have noticed in one of my formicaria a subterranean cemetery, where I have seen some ants burying their dead by placing earth above them. *One ant was evidently much affected,* and tried to exhume the bodies, but the united exertions of the yellow sextons were more than sufficient to neutralize the effort of the *disconsolate mourner.*"[1] [Italics mine.]

He quotes from Dr. Kemp an account of a strange queen bee attempting to enter a hive; the workers "surround her and hold her until she

[1] *Animal Intelligence,* p. 92.

starves to death; *but such is their respect for royalty* that they never attempt to sting her."[1] [Italics mine.]

It is needless to multiply instances,[2] as I must give in full the tale of the Cat and the Thumb-latch.

"My own coachman once had a cat which, certainly without tuition, learnt thus to open a door which led into the stables from a yard into which looked some of the windows of the house. Standing at these windows when the cat did not see me, I have many times witnessed her *modus operandi*. Walking up to the door with a most matter-of-course kind of air, she used to spring at the bottom of this half-loop handle just below the thumb-latch. Holding on to the bottom of this half-loop with one fore-paw, she then raised the other to the thumb-piece, and while depressing the latter, finally with her hind legs scratched and pushed the doorposts so as to open the door. Precisely similar movements are described by my correspondents as having been witnessed by them.

"Of course, in all such cases the cats must have previously observed that the doors are opened by persons placing their hands upon the handles, and, having observed this, the animals forthwith act by what may be strictly termed rational imitation. But it should be observed that the process, as a whole, is something more than imitative. For not only would observation alone be scarcely enough (within any limits of thoughtful reflection that it would be reasonable to ascribe to an animal) to enable a cat upon the ground to distinguish that the essential part of the process as performed by the human hand consists, not in grasping the handle, but in depressing the latch; but the cat certainly never saw any one, after having depressed the latch, pushing the doorposts with his legs; and that this pushing action is due to an originally deliberate intention of opening the door, and not to having accidentally found this action to assist the process, is shown by one of the cases communicated to me (by Mr. Henry A. Gaphaus); for in this case, my correspondent says, 'the door was not a loose-fitting one by any means, and I was surprised that by the force of one hind leg she should have been able to push it open after unlatching it.' Hence we can only conclude that the cats in such cases have a very definite idea as to the mechanical properties of a door; they know that to make it open, even when unlatched, it requires to be *pushed*—a very different thing from trying to imitate any particular action which they may see to be performed for the same purpose by man. The whole psychological process, therefore, implied by the fact of a cat opening a door in this way is really most complex. First the animal must have observed that the door is opened by the hand grasping the handle and moving the latch. Next she must reason by 'the logic of feelings'—if a hand can do it, why not a paw? Then, strongly moved by this idea, she makes the first trial. The steps which follow have not been observed, so we cannot certainly say whether she learns by a succession of trials that depression of the thumb-piece constitutes the essential part of the process, or, perhaps more probably, that her initial observations supplied her with the idea of clicking the thumb-

[1] *Ibid.*, p. 164.

[2] Parallel cases will be found on the following pages of *Animal Intelligence:* pp. 76, 88, 90, 92, 94, 157, 158, 160, 162, 166, 169, 183, 187, 196, 211, 227, 228.

In *Mental Evolution in Animals*, p. 156, the story of the Dog and the Bone rivals, in interpretation, that of the Cat and the Thumb-latch.

piece. But, however this may be, it is certain that the pushing with the hind feet after depressing the latch must be due to adaptive reasoning unassisted by observation; and only by the concerted action of all her limbs in the performance of a highly complex and most unnatural movement is her final purpose attained."[1]

The cat's reasoning processes by 'the logic of feelings' call for no comment from me, but of the last sentence I may say that it seems typical of all of Romanes' psychological work. "It is certain," he says, "that the pushing with the hind feet after depressing the latch must be due to *adapted reasoning unassisted by observation.*" [Italics mine.] Cat pushes door with hind feet; cat makes necesary adjustments by 'adaptive reasoning.' Now the pushing may have been 'unassisted by observation,' but it does not follow that it was a result of 'adaptive reasoning,'—whatever that may mean. This is a fair sample of the kind of explanation that scientific men with little knowledge of psychology turn out as contributions to psychology.

Now to provide the very first step of proof for 'adaptive reasoning' in the cat-case we ought to have had the cat's *first spring* at the door-latch described to the minutest details. Could we see the cat on the ground laying her plans, and then forthwith carrying them out promptly and perfectly, we might be able to attribute the results to 'adaptive reasoning;' but since a minute account of the first spring is not forthcoming, the only probable explanation is that when the cat hung upon the thumb-latch she tried, after the manner of cats, to obtain additional support for her weight by driving the claws of her hind feet into the wood work. Being near the jamb, one of her feet rested easily upon it; an accidental and harder push with that foot caused the door to give slightly. The opening of the door being her object, her attention is sooner or later caught by the connection between her own push and the movement of the door. The action once accomplished is again and again repeated until perfected.

I have seen an analogous case with a kitten. She has tried to leap upon a window sill from the floor. Three long curtains hang from the top of the window, a lace net, which covers the window, and two velvet curtains which hang one at each side. After a great many ineffectual attempts to penetrate the lace at the middle of the window, the kitten on one occasion endeavored to climb up the curtains where the velvet overlapped the lace. In pulling first on one and then on the other, while mounting step by step, she separated the curtains, and thus easily reached the sill. This happy accident, repeated many times, has led to her complete mastery of the adjustments of

[1] *Animal Intelligence*, pp. 420-22.

actions necessary to reach the sill. Having watched her first attempts and her numberless failures, it seems to me it would take a large fund of credulity, imagination and ignorance combined to assign to the finished product even a modicum of 'adaptive reasoning.'

The cat and the thumb-latch story shows a complete absence of experience in tracing the genesis of a process, and is sufficient to discredit a man's whole work in comparative psychology. Common observation of the early actions of an animal ought to be enough to prevent the wholesale importation of reasoning processes into the explanation of the later and perfected actions, just because those actions appear as reasonable. In everyday language, all action performed with an end in view is considered reasonable, provided that the end makes for the advantage of the individual, but it does not, therefore, follow that any reasoning process whatever is called into play.

Before closing this survey of the contributions Romanes made to general psychology I must say a few words regarding his writings as a whole. Unfortunately much of the usefulness of his work is impaired by his literary style. In his large books on Mental Evolution there are literally dozens of pages, supposed to stand for general surveys or general summaries, which are merely collections of remarks to the reader about what he has seen, will see, or ought to see, if he looks,—remarks which add nothing to the author's statements or arguments. Besides these, there are hundreds of lines telling us what the author is about to do next.[1] In the chapter on Comparative Philology alone these remarks amount to nearly a printed page.

Good as some of his work really was, the verbosity of his style, the constant and lengthy quotations, the repetition of earlier and the anticipation of later statements and arguments, make his books difficult and unprofitable reading for the student of biology, psychology or philosophy.

That he carried weight in his day and generation is a fact. Why he carried the weight he did is to be explained more by the outward conditions of his life than by the value of his work from either a literary or a scientific point of view. He was the friend of Darwin,—to a certain extent, his literary executor, in that he received all of Darwin's notes on psychology, and published the essay on Instinct as an Appendix to a book of his own; his work in physiology had received favorable notice from most of the leading physiologists of his day; being the man that he was as a personality, as a friend,—and, above all, writing at a time when any one giving a fairly lucid exposition of the principles of evolution received attention, and was

[1] See, for instance, *Mental Evolution in Man*, pp. 244-45.

regarded as an authority,—with all these facts conspiring in his favor, it is hardly to be wondered at that Romanes obtained for himself a hearing and carried weight with the general public out of all proportion to the value of his work.

One cannot read his psychological books and deny that he was painstaking in the collection of material and careful in its elaboration; or, on the other hand, deny that his ill-worked-out theories are based upon voluminous quotations from writers, some of whom were even then antiquated, and many more, specialists in subjects other than those in whose support they are cited. One lays them down with the feeling that they form but an amorphous, inorganic whole.

§ 2. Mind in the Causal Series.

Does mind come into the causal series of organic evolution at large? Is it actively concerned in progress, *i. e.*, has it a "survival value?"

Regarding mind in the causal series at large, Romanes is either much less certain, or much more guarded in his views than Darwin, and he has left us both meager and somewhat contradictory statements concerning it. He says: "We have now seen that instincts may have what I term a blended origin —or, in other words, that intelligent adjustment by going hand in hand with natural selection, must greatly assist the latter principle in the work of forming instincts, inasmuch as it supplies to natural selection variations which are not merely fortuitous, but from the first adaptive. I shall next show what I conceive to be the chief modes in which intelligence thus operates, or co-operates with selection, in the formation of instincts."[1] This would seem to indicate that mind was 'actively concerned in progress.' And in his Rede lecture 'Mind and Motion'[2] he has the following:

"To adduce only one other consideration. Apart from all that I have said, is it not in itself a strikingly suggestive fact that consciousness only, yet always, appears upon the scene when the adjustive actions of any animal body rise above the certain level of intricacy to which I have alluded? Surely this large and general fact points with irresistible force to the conclusion, that in the performance of these more complex adjustments, consciousness—or the power of feeling and the power of willing—is of some *use*. Assuredly on the principles of evolution, which materialists at all events cannot afford to disregard, it would be a wholly anomalous fact that so wide and important a class of faculties as those of the mind should have become developed in constantly ascending degrees throughout the animal kingdom, if they were entirely without use to animals. And, be it observed, this consideration holds good whatever views we may happen to enter-

[1] *Mental Evolution in Animals*, p. 219.
[2] *Mind and Motion*, pp. 24-5.

tain upon the special theory of natural selection. For the consideration stands upon the general fact that all the organs and functions of animals are of use to animals: we never meet, on any large or general scale, with organs and functions which are wholly adventitious. Is it to be supposed that this general principle fails just where its presence is most required, and that the highest functions of the highest organs of the highest animals stand out of analogy with all other functions in being themselves functionless? To this question, I, for one, can only answer, and answer unequivocally, no. As a rational being who waits to take a wider view of the facts than that which is open to the one line of research pursued by the physiologist, I am forced to conclude that not without a reason does the mind exist in the frame of things: and that apart from the activity of mind, whereby motion is related to that which is not motion, this planet could never have held the wonderful being, who in multiplying has replenished the earth and subdued it—holding dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth."

He speaks of the art of writing as of "inestimable advantage" to civilized man over savage man in "the consequent transmission of effects of culture from generation to generation."

"Quite apart from any question as to the hereditary transmission of acquired characters, we have in this *intellectual* transmission of acquired *experience* a means of accumulative cultivation quite beyond our powers to estimate. For, unlike all other cases where we recognize the great influence of individual use or practice in augmenting congenital 'faculties' (such as in the athlete, pianist, etc.), in this case the effects of special cultivation do not end with the individual life, but are carried on and on through successive generations *ad infinitum*. Hence, a civilized man inherits mentally, if not physically, the effects of culture for ages past, and this in whatever direction he may choose to profit therefrom. Moreover—and I deem this an immensely important addition—in this unique department of purely intellectual transmission, a kind of non-physical natural selection is perpetually engaged in producing the best results. For here a struggle for existence is constantly taking place among 'ideas,' 'methods,' and so forth, in what may be termed a psychological environment. The less fit are superseded by the more fit, and this not only in the mind of the individual, but, through language and literature, still more in the mind of the race."[1]

It would seem from this that he looked upon intelligence as having a "survival value" in the organic series.

In his philosophical views as to the ultimate relations of brain and mind, of which I shall speak later, Romanes was a monist, and this position would be irreconcilable with any concept of mind as *dipping into* a progressing series at various points, and acting thereby as a causal agent.

The quotations given, indicative of a causal relation between mind and an organic series, contain nearly all that Romanes said upon the subject. In view of the meagerness of his remarks, and of what must be termed their distinctly contra-

[1] *Darwin and After Darwin*, p. 33.

dictory character when taken in the light of his monistic theory of the relation of mind and body, we can only safely say that mind played *some* part in Romanes' scheme of organic evolution, but just what he does not tell us.

§ 3. Definition of Mind.

Unlike Darwin, Romanes was precise in his definition of mind. In the Introduction to *Animal Intelligence* he gives us an explicit statement of what he intended the term to cover, a statement which he substantially repeated in *Mental Evolution in Animals*. Romanes drew the line of mind much more closely than did Darwin. His purpose, however, differed widely from Darwin's, and it was to the advantage of his theory of mental evolution to limit, rather than to extend the meaning of his term. The purpose which underlay his entire work in evolutional psychology was the proof of the "probable genesis of mind from non-mental antecedents."[1] By placing the most rigorous strictures upon mental elements, the non-mental elements were brought within easy reach of the theory, being nothing more nor less than instinctive and reflex actions,—two sorts of action which Darwin had included in a general lump sum of mentality.

The criteria of mind for Romanes were threefold: first, the manifestation must be present in a living organism; 2nd, the manifestation must exhibit consciousness and choice; and, lastly, the organism must show itself "able to learn by its own individual experience." Mental evolution he expressed in a comparatively simple series: Reflex Action, Instinct, Intelligence.

"*Reflex* action is non-mental neuro-muscular adjustment, due to the inherited mechanism of the nervous system, which is formed to respond to particular and often recurring stimuli by giving rise to particular movements of an adaptive, though not of an intentional kind.

"*Instinct* is reflex action into which there is imported the element of consciousness. The term is, therefore, a generic one, comprising all those faculties of mind which are concerned in conscious and adaptive action, antecedent to individual experience, without necessary knowledge of the relation between means employed and ends attained, but similarly performed under similar and frequently recurring circumstances by all the individuals of the same species.

"*Reason* or intelligence is the faculty which is concerned in the intentional adaptation of means to ends. It therefore implies the conscious knowledge of the relation between means employed and ends attained, and may be exercised in adaptation to circumstances

[1] *Animal Intelligence*, p. 3. On p. 5 'evolution' is substituted for 'genesis.'

novel alike to the experience of the individual and to that of the species."[1]

To the above quotation may be added these further statements taken from the *Mental Evolution in Animals.*

"Whenever this stage is reached, and a nerve center begins to become conscious of its own working, we pass, according to my classification, from the domain of reflex action into that of instinct—instinct being in my terminology reflex action into which there is imported the element of consciousness."[2]

"Now, in so far as instinct requires to be mixed with intelligence in order to be effective, it is as an instinct imperfect; it is as an instinct in course of formation, or at any rate not perfectly adapted to the possible circumstances of life."[3]

"While the stimulus to a reflex action is, at most, a sensation, the stimulus to an instinctive action can only be a perception."[4]

"The advent and development of consciousness, although progressively converting reflex action into instinctive, and instinctive into rational, does this exclusively in the sphere of subjectivity;"[5] and "instinct passes into reason by imperceptible degrees."[6]

In view of the facts, however, Romanes was not able to maintain the continually upward trend of instinct, but was obliged to admit that instincts were mixed in their origin, some being "pure," and some "lapsed intelligence;" the latter he called secondary instincts.

" . . . . Adjustments originally intelligent may, by frequent repetition, become automatic, both in the individual and in the race; as instances of such 'lapsed intelligence' in the individual I have given the highly co-ordinated and laboriously acquired actions of walking, speaking, and others."[7]

Almost the whole of Vol. II of *Darwin and After Darwin* is devoted to the question of character as hereditary and acquired, and hence to those of the development and meaning of reflex action, instinct and intelligence, and of the inheritance of structural useful or non-useful peculiarities. His earlier views are here treated somewhat more from a biological standpoint; nevertheless there is substantial agreement with those of his psychological work.

To sum up, then, Romanes meant by the term 'mind' Intelligence in the common acceptation of the word, and did not include in it either instinct or reflex actions.

---

[1] *Ibid.*, p. 7.
[2] *Mental Evolution in Animals*, p. 319.
[3] *Ibid.*, p. 176.
[4] *Ibid.*, p. 260.
[5] *Animal Intelligence*, p. 12.
[6] *Ibid.*, p. 16.
[7] *Mental Evolution in Animals*, p. 200.

§ 4. Relation of Mind and Body.

If Romanes was not clear upon the place of mind in an evolving series, he had, on the other hand, worked out clearly and somewhat fully the relation obtaining between mind and body. For him, as for Darwin, there was a distinct parallelism between "structural affinity and mental development."

"There is, indeed, a general and, philosophically considered, most important parallelism running through the whole animal kingdom between structural affinity and mental development; but this parallelism is exceedingly rough, and to be traced only in broad outlines, so that although it is convenient for the purpose of definite arrangement to take the animal kingdom in the order presented by zoölogical classification, it would be absurd to restrict an inquiry into Animal Psychology by any considerations of the apparently disproportionate length and minute subdivision with which it is necessary to treat some of the groups. Anatomically, an ant or a bee does not require more consideration than a beetle or a fly; but psychologically there is need for as great a difference of treatment as there is in the not very dissimilar case of a monkey and a man."[1]

This rough parallelism, however, betokened a deeper, underlying unity in the relation of mind and body,—a relation, not between mind and body in gross, but between consciousness and nerve processes. "We have already taken it for granted that Mind has a physical basis in the functions of the nervous system, or that every mental process has a corresponding equivalent in some neural process. I shall next endeavor to show how precise this equivalency is."[2]

And again. "It is enough if we are agreed that every psychical change of which we have any experience is invariably associated with a definite physical change, whatever we may suppose to be the nature and significance of this association."[3]

He also pointed out the parallelism between pathological mental and physical states. "But for the sake of systematic completeness I shall conclude this exposition by briefly pointing out that all those pathological derangements which occur in the nervous centers that preside over muscular activities, have their parallels in similar derangements which occur in the nervous centers that are concerned in mental activities."[4]

In the *Mental Evolution in Animals* Romanes devotes several chapters to the nervous system as the physical basis of mind; not only is brain the seat of mind, but its microscopic elements are the substrate of mental processes, and in these elements he finds the objective side of psychical processes from simple sensation to complex association.

---

[1] *Animal Intelligence*, pp. 9 and 10.
[2] *Mental Evolution in Animals*, p. 34.
[3] *Ibid.*, p. 47.
[4] *Ibid.*, p. 44.

The following quotations will make this clear:

"This, of course, is just as it ought to be, if the brain, which the skull has to accommodate, has been gradually evolved into larger and larger proportions in respect of its cerebral hemispheres, or the upper masses of it *which constitute the seat of intelligence.*"[1] [Italics mine.]

"Within experience mind is invariably associated with highly differentiated collocations of matter and distributions of force, and many facts go to prove, and none to negative, the conclusion that the grade of intelligence invariably depends upon, or at least is associated with, a corresponding grade of cerebral development."[2]

"That the grey matter of the cerebral hemispheres is the exclusive seat of mind is proved in two ways. In the first place, if we look to the animal kingdom as a whole, we find that, speaking generally, the intelligence of species varies with the mass of this grey matter. Or, in other words, we find that the process of mental evolution, on its physical side, has consisted in the progressive development of this grey matter superimposed upon the pre-existing nervous machinery, until it has attained its latest and maximum growth in man.

"In the second place, we find that when the grey matter is experimentally removed from the brain of animals, the animals continue to live; but are completely deprived of intelligence. All the lower nerve centers continue to perform their mechanical adjustments in response to suitable stimulation; but they are no longer under the government of the mind."[3]

"There can be no doubt that in the complex structure of the cerebral hemispheres one nervous arc (*i. e.*, fibres, cells and fibres) is connected with another nervous arc, and this with another almost *ad infinitum;* and there can be equally little doubt that processes of thought are accompanied by nervous discharges taking place, now in this arc, and now in that one, according as the group of nerve-cells in each arc is excited to discharge its influence by receiving a discharge from some of the other nerve-arcs with which it is united. . . . . We thus see that the most fundamental of psychological principles—the association of ideas—is merely an obverse expression of the most fundamental of neurological principles—reflex action."[4]

The problem which confronted him consisted in showing that if body could be looked upon in any way as the physical substrate of mind, a relation must exist between them such that phenomena occurring in the one must subtend corresponding phenomena occurring in the other. Without such correspondence of phenomena in the two, a relation between them, if present, would be beyond the bounds of human demonstration. Unable to find an exact parallelism between gross anatomy and mind, Romanes endeavored, by reducing his terms to microscopic proportions, likewise to reduce the difficulties of his problem.

But not even in the cell did he discover a final and satisfactory solution, and he was obliged to appeal to plain matter and force in the last analysis.

---

[1] *Darwin and After Darwin*, Vol. I, p. 196.
[2] *Theism*, p. 103.
[3] *Mind and Motion*, pp. 5-6.
[4] *Mental Evolution in Animals*, pp. 37-8.

"What we know as mind is dependent (whether by way of causality or not is immaterial) on highly complex forms of *what we know* as Matter, in association with peculiar distributions of *what we know* as Force."[1]

In a work entitled *Mind and Motion and Monism*, most of the chapters of which have appeared as magazine articles, he takes up the metaphysical side of this relation of mind and body. After discussing causality in general, he points out that "the only resemblance between this supposed case of causation (from neurosis to psychosis) consists in the invariability of the correlation between cerebral process and mental processes; in all other points the analogy fails."[2]

"I could certainly prove that whatever the connexion between body and mind may be, we have the best possible reasons for concluding that it is not a causal connexion."[3]

The following paragraph from *Theism*, written some twenty years earlier, takes up the same position as is held in the *Mind and Motion and Monism:*

"So long as Matter and Mind, x and y, are held to be antithetically opposed in substance, so long must materialism suppose that a connection of causality subsists between the two, such that the former substance is *produced* in some unaccountable way by the latter. But when Mind and Matter, x and y, are supposed to be identical in substance, the need for any additional supposition as to a causal connection is excluded. But unless we hold what seems to me an uncalled for opinion, that the essential feature of Materialism consists in a postulation of a causal connection between x and y, it would appear that the only effect of supposing x and y to be really but one substance, z, must be that of *strengthening* the essential doctrine of Materialism—the doctrine, namely, that conscious intellectual existence is *necessarily* associated with that form of existence which we know phenomenally as Matter and Motion. If it is true that a "moving molecule of inorganic matter does not possess mind or consciousness, but it possesses a small piece of Mind-stuff," then assuredly the central position of Materialism is shown to be impregnable. For while it remains as true as ever that mind and consciousness can only emerge when what we know phenomenally as "Matter takes the complex form of living brain," we have abolished the necessity for assuming even a causal connection between the substance of what we know phenomenally as matter and the substance of what we know phenomenally as Mind: we have found that, in the last resort, the phenomenal connection between what we know as Matter and what we know as Mind is actually even more intimate than a connection of causality; we have found that it is a substantial identity."[4]

Since it is not within the scope of this study to give the arguments by which our author reached his conclusions, but merely to state the views he held upon certain definite questions, I will

[1] *Theism*, p. 188.
[2] *Mind and Motion and Monism*, p. 62.
[3] *Ibid.*, p. 20.
[4] *Theism*, pp. 186-7.

sum up his various writings upon the ultimate nature of the relation of mind and body by saying that Romanes held it to be much deeper than a causal connection. The known data were to him inexplicable upon the theory of the interaction of two independent realities, and it was in the theory of monism that he sought, and believed that he had found, the solution of his problem. "This theory is, as we have already seen, that *mental phenomena* and *physical phenomena*, although apparently *diverse, are really identical.*"

"If we thus unite in a higher synthesis the elements both of spiritualism and of materialism, we obtain a product which satisfies every fact of feeling on the one hand, and of observation on the other. We have only to suppose that the antithesis between mind and motion—subject and object—is itself phenomenal or apparent; not absolute or real. We have only to suppose that the seeming duality is relative to our modes of apprehension; and, therefore, that any change taking place in the mind, and any corresponding change taking place in the brain, are really not two changes, but one change."[1]

§ 5. What Evolves in Mental Evolution?

What evolves in 'mental evolution,'—mind, body, or both mind and body? If mind only, how can it influence organic evolution? If body only, how does its evolution carry with it the evolution of mind? If both, what is the course of 'mental evolution?'

From the data already given regarding the relation of mind and body, the question as to what evolves in mental evolution might almost be expected to answer itself. Not so. No problem which Romanes wrote upon was so clumsily treated, or left more at loose ends than this. With the statement of the absolute monism of mind and body, the presence of mind in each and every bodily, or at least neural process would seem a necessary deduction. For him it was otherwise.

Romanes had taken upon himself the task of elucidating a theory of mental development in which the genesis of mind is to be traced from non-mental elements, *i. e.*, from instinct and reflex action and, indeed, from physiology itself. This evolutional theory attempted to do for mind what Darwin had done for species, to show a graded series from lower to higher, and a continuity in that series by means of natural inheritance.

"My position is that Mind is everywhere continuous, and if for purposes of analysis or classification we require to draw lines of demarcation between the lower and the higher faculties thereof, I contend that we should only do so as an evolutionist classifies his animal or vegetable species: higher or lower do not betoken differences of *origin*, but differences of *development*."[2]

---

[1] *Mind and Motion and Monism*, pp. 83-84.
[2] *Mental Evolution in Man*, p. 234.

"I hold that if the doctrine of Organic Evolution is accepted, it carries with it, as a necessary corollary, the doctrine of Mental Evolution, at all events as far as the brute creation is concerned. For throughout the brute creation, from wholly unintelligent animals to the most highly intelligent, we can trace one continuous gradation; so that if we already believe that all specific forms of animal life have had a derivative origin, we cannot refuse to believe that all the mental faculties which these various forms present must likewise have had a derivative origin. And, as a matter of fact, we do not find any one so unreasonable as to maintain, or even to suggest, that if the evidence of Organic Evolution is accepted, the evidence of Mental Evolution, within the limits which I have named, can consistently be rejected. The one body of evidence therefore serves as a pedestal to the other, such that in the absence of the former the latter would have no *locus standi* (for no one could well dream of Mental Evolution were it not for the evidence of Organic Evolution, or for the transmutation of species); while the presence of the former irresistibly suggests the necessity of the latter, as the logical structure for the support of which the pedestal is what it is."[1]

Such are the general outlines of his fundamental postulates of the evolution of mind.

The *modus operandi* is less simple than it seems. Having started to evolve mind from non-mental elements, Romanes has recourse to physiology, and there finds the root principles of intelligence.

"Looking, then, at the phenomena of Mind as invariably presenting a physical, or, as we may indifferently call it, a physiological side, I shall endeavor to point out what I conceive to be the most ultimate principle of physiology which analysis shows to be common to them all. On the mental side, as we have already seen, we have no difficulty in distinguishing this ultimate principle, or common characteristic, as that which we designate by the term Choice. Now if the power of choice is the distinctive peculiarity of a mental being, and if, as we have taken for granted, every change of Mind is associated with some change of Body, it follows that this distinctive peculiarity ought to admit of being translated into some physiological equivalent. Further, if there is any such physiological equivalent to be found, we should expect to find it much lower down in the scale of physiological development than in the functions of the human brain. For not only do the lower animals manifest, in a long descending scale, powers of choice which gradually fade away into greater and greater simplicity; but we should be led *a priori* to expect, if there is a physiological principle which constitutes the objective basis of the psychological principle, that the former should manifest itself more early in the course of evolution than the latter. For, whatever views we may entertain concerning the relation of Body and Mind, there can be no question, on the basis of the evolution theory which I assume, that, as a matter of historical sequence, the principles of physiology were prior to those of psychology; and therefore, if in accordance with our original agreement we allow that the latter have a physical basis in the former, it follows that the principles of physiology, which now constitute the objective basis of choice, whatever they may be, probably came into operation long before they were sufficiently evolved thus to constitute the foundation of psychology."[2]

---

[1] *Mental Evolution in Animals*, p. 8. [2] *Ibid.*, pp. 47-8.

It is to excitability that he looks for a solution of the problem. "Thus, co-extensive with the phenomena of excitability, that is to say, with the phenomena of life, we find this function of selective discrimination; and, as I have said, it is this function that I regard as the root-principle of Mind. . . . . The distinguishing property of mind, on its physiological side, consists in this power of discriminating between different kinds of stimuli, irrespective of their degrees of mechanical intensity."[1]

To the question, then, 'what evolves in mental evolution, mind or body?' Romanes answers "Both evolve;" yet by the above showing there is not a mutual conditioning of each by the other—as Darwin held regarding them—but a very definite and precise conditioning of the mind by the body, never the reverse.

From mere excitability and discrimination of single cells, we pass upward to "ganglia which have fully *learned* their work" (*M. E. in A.*, p. 36), or "a ganglion (which) may *forget* its activity" (*Ibid.*, p. 75), until at last we find that "Reasoning consists in a selective discrimination among all those exceedingly delicate stimuli which, on their subjective side, we know as arguments. Similarly regarded, Judgment is likewise nothing more than the final result of the incidence of a vast number of very delicate stimuli; and this final result, like all the intermediate steps of the reasoning which led to it, is nothing more than the exercise of a power to discriminate between the stimulus which on its subjective side we recognize as the right, and that which we similarly recognize as the wrong. Lastly, Volition, subjectively considered, is the faculty of consciously selecting motives; and motives, objectively considered, are nothing more than immensely complex and inconceivably refined stimuli to nervous action."[2]

In the course of Mental Evolution, then, physiological function and morphological structure precede the advent of mental activity in point of time, *and the evolution of these carries with them the evolution of Intelligence* by means of the increasing differentiation and complexity of the neural elements which serve as the Physical Basis of Mind.

SUMMARY.

We have seen (1) that Romanes held but vaguely that mind is causally related to organic evolution; (2) that the relation of mind to body was one of complete monism; (3) that by *mind* he meant only such manifestations of the living organism as

[1] *Ibid.*, pp. 51 and 53.
[2] *Mental Evolution in Animals*, p. 53.

gave evidence of purpose and choice; and (4) that Mental Development " consists essentially in a progressive co-ordination of progressively developing faculties " (*M. E. in A.*, p. 40), preceded by a morphological and physiological evolution of its physical substrate, the body.

His postulation of the development of Mind from non-mental elements, together with the priority of physiology over mind in point of time, give him a philosophical position among the Materialistic Monists.[1]

---

[1] It may throw a side light upon Romanes' views to glance at the literature to which he referred in his psychological works. Some fifty titles will be found in the books on Mental Evolution, the most important authors being Bain, Bastian, Binet, Carpenter, Darwin, Fiske, Houzeau, Huxley, Lazarus, Lewes, Maudsley, Jas. Mill, J. S. Mill, Max Müller, Perez, Preyer, Ribot, Spencer, Sully, Taine and Wundt. If we may judge from the quantity and general character of his quotations, Romanes seems to have derived his psychology mainly from the following five volumes: G. H. Lewes, *Problems of Life and Mind;* Max Müller, *Science of Thought;* Herbert Spencer, *Principles of Psychology;* H. Taine, *On Intelligence;* W. Wundt, *Vorlesungen über die Menschen u. Thierseele.*

It is hard to understand how a careful student could print work upon psychology, and yet omit to mention a score, at least, of the most important books on the subject. The year of the publication of *Mental Evolution in Man* (1889), Fechner's *Elemente der Psychophysik* had reached even its second edition. It is equally hard to see how one can write upon philosophy—upon monism and fundamental principles—and depend upon W. K. Clifford and Herbert Spencer as the chief authorities, never mentioning Kant, Fichte, Schelling, Hegel, Lotze, Wundt, or Avenarius.